



## Original Article

## Descriptive Analysis of Neonatal Mortality during May 2023 at Holy Family Hospital Rawalpindi

Shazia Zeb<sup>1</sup>, Farzana Fatima<sup>2</sup>, Rizwana Shahid<sup>3\*</sup>, Yumna Hafeez<sup>4</sup>, Sumera Sattar<sup>1</sup> and Minahil Arshad<sup>5</sup><sup>1</sup>Holy Family Hospital, Rawalpindi, Pakistan<sup>2</sup>Department of Medical Education, Rawalpindi Medical University, Rawalpindi, Pakistan<sup>3</sup>Department of Community Medicine, Rawalpindi Medical University, Rawalpindi, Pakistan<sup>4</sup>Shifa College of Medicine, Islamabad, Pakistan<sup>5</sup>Pakistan Institute of Medical Sciences, Islamabad, Pakistan

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## \*Corresponding Author:

Rizwana Shahid

Department of Community Medicine, Rawalpindi Medical University, Rawalpindi, Pakistan  
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## ABSTRACT

Although child mortality has substantially been declined due to stringent efforts for achieving the set targets meant to attain health related Millenium Development Goals (MDGs) by 2015, yet the reduction in neonatal mortality has been noted at comparatively slower pace. Considerable neonatal deaths have also been reported in South Asian regions of the globe. **Objective:** To analyze neonatal mortality in terms of place of delivery, antenatal booking and maternal as well as medical causes of death. **Methods:** A cross-sectional descriptive study was done during May 2023 to determine various attributes of neonatal mortality like delivery site and antenatal visits. In addition to maternal factors contributing to neonatal mortality, post-delivery mortality reasons were also recorded. Data were entered and analyzed by using Microsoft Excel 2016. **Results:** Out of 100 neonatal mortalities about 88.5% were early neonatal deaths. 21% and 79% were home and hospital delivered neonates respectively. Of the 49 booked cases, 35% were delivered in private hospitals while 25.5% of the remaining non-booked cases were delivered in private healthcare facilities. Approximately 47% and 53% were preterm and full-term births respectively. 35.6% neonates died of bacterial sepsis while 22% and 19% neonates succumbed to respiratory distress syndrome and intrauterine hypoxia respectively. **Conclusions:** There were considerable early neonatal deaths and majority died of bacterial sepsis and respiratory distress syndrome.

## INTRODUCTION

Neonatal period is the most crucial time span of life with the greatest risk of mortality [1]. Neonatal mortality is a valuable healthcare indicator that not only reflects neonatal well-being but is also illustrative of profoundly associated maternal health [2]. Sub-Saharan Africa was determined with the greatest neonatal mortality worldwide that constitute 43% of the total neonatal fatalities. Newborn deaths in central and southern Asia are almost equivalent to 36% of the global neonatal mortalities [3]. Of the seventeen Sustainable Development Goals (SDGs), third one (Good health and well-being) is remarkably

imperative as it is meant to promote health and well-being among people of all ages. The remaining 16 SDGs are indirectly related to health but their implication in achievement of optimum health by all cannot be underestimated [4]. Although neonatal mortality rate across the globe has drastically been diminished to 18 death / 1000 live births in 2021; yet the efforts done to achieve the succeeding targets of the Millenium Development Goals (MDGs) for better health till 2015 cannot be undervalued [5]. Maternal and child health can be improved by provision of equitable healthcare services

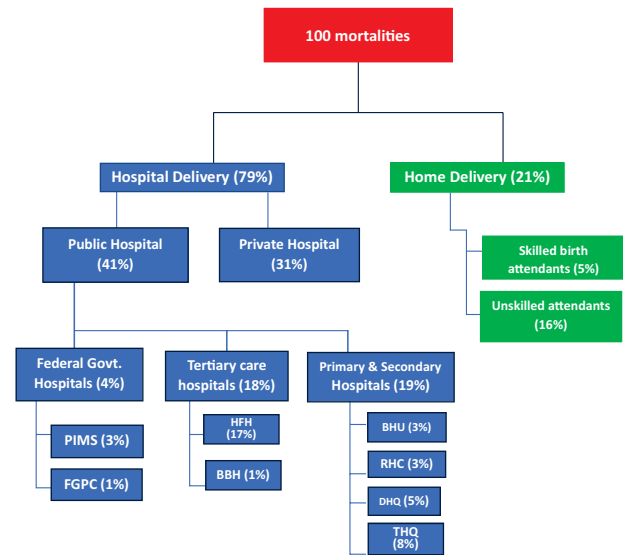
irrespective of racial and ethnic variations [6]. Although there is reduction in neonatal mortality rate of Pakistan from 56.9/1000 live births (2000) to 39.4/1000 live births (2021); it is still greater than that of India (19/1000 live births) and Afghanistan (19/1000 live births) [7]. This worse healthcare outcome in Pakistan has recently been attributed to poor education and undernourishment of mothers. Moreover, increase neonatal mortality in our country is also linked to delivery of baby in healthcare settings that are not sufficiently equipped with essential healthcare services [8]. According to Child Health and Mortality Prevention Surveillance (CHAMPS) that intends to collect comprehensive data pertaining to neonatal and infant mortality from Southern Asian and Sub-Saharan regions of the world, about 41%, 41% and 18% of the deaths were reported during first 24 hours of life, early neonatal and late neonatal period of life respectively. Majority of the neonates succumbed to prematurity, infections and respiratory distress. Most of the neonatal deaths were associated with maternal hypertension [9]. Although all countries are destined to reduce neonatal mortality to 12 / 1000 live births till 2030 as per SDGs; however, the given targets in Millennium Development Goals (MDGs) to reduce the aforementioned mortality rate lagged behind with substantial gap and could not be satisfactorily attained till 2015 [10]. The current study is therefore intended to ascertain the neonatal mortality reported in a public sector tertiary care facility along with place of delivery and neonatal or maternal causes linked with poor outcome. This research would enable our policy makers to scale up the healthcare indicators particularly those related to maternal neonatal and child health by stringent efforts as needed to improve healthcare facilities as strengthening the healthcare system would really prove beneficial to get rid of grave healthcare consequences.

**METHODS**

A cross-sectional descriptive study was carried out during May 2023 to determine various attributes of neonatal mortality like delivery site and antenatal visits. In addition to maternal factors contributing to neonatal mortality, post-delivery mortality reasons were also recorded. Data were gathered with informed consent and ethical approval letter for this purpose was also received from the concerned hospital administrators. Data were entered and analyzed by using Microsoft Excel 2016. Descriptive statistics were applied.

**RESULTS**

Of the total 100 neonatal mortalities reported at Holy Family Hospital Rawalpindi during May 2023, 79% were hospital delivered while rest of 21% neonates were delivered at home as depicted below in Figure 1.



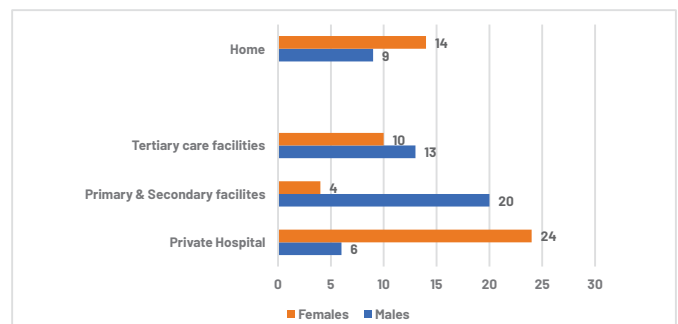
**Figure 1:** Birth place of the neonates

PIMS- Pakistan Institute of Medical Sciences, FGPC- Federal Government PolyClinic, BHU – Basic Health Unit, RHC- Rural Health Centre, DHQ- District Head Quarters, THQ- Tehsil Head Quarters, HFH- Holy Family Hospital. About 88.5% of the deaths were during early neonatal period. Proportion of booked and non-booked cases is shown below in Table 1.

**Table 1:** Booking status of the obstetric cases in relation to place of delivery

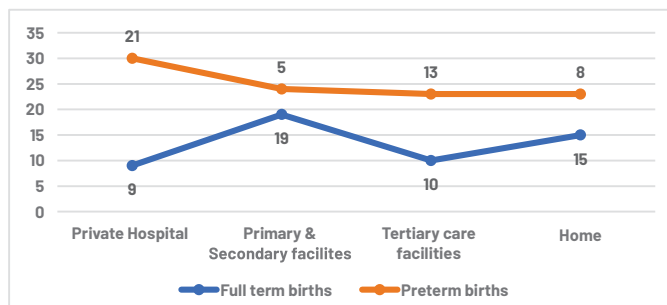
Delivery cases	Delivered at				Total
	Private hospital (PIMS, FGPC)	Primary & Secondary care facilities (BHU, RHC, DHQ, THQ)	Tertiary care facility (HFH)	Home	
Booked	17 (35%)	16 (32.7%)	14 (28.6%)	02 (3.7%)	49
Non-Booked	13 (25.5%)	08 (15.7%)	9 (17.6%)	21 (41.2%)	51
Total	30	24	23	23	100

PIMS- Pakistan Institute of Medical Sciences, FGPC- Federal Government PolyClinic, BHU – Basic Health Unit, RHC- Rural Health Centre, DHQ- District Head Quarters, THQ- Tehsil Head Quarters, HFH- Holy Family Hospital. Gender-based deliveries in relation to place of delivery is depicted below in Figure 2.



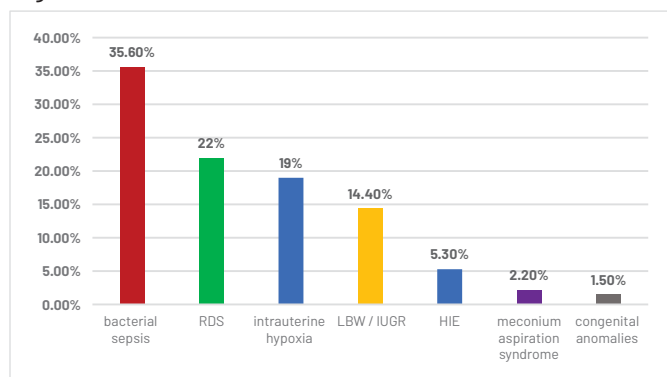
**Figure 2:** Gender-wise data with respect to place of delivery

Of the mothers delivered in private hospital, only 2 had gestational diabetes while one mother was reported with Pregnancy Induced Hypertension (PIH). 3 twin pregnancies were registered at HFH. Trend of full term and preterm births is revealed below in Figure 3.



**Figure 3:** Trend of preterm and full-term birth with respect to place of delivery

Of the total 100 neonatal mortalities, most (35.6%) were attributed to bacterial sepsis while 22% were succumbed to Respiratory Distress Syndrome (RDS) as shown below in Figure 4.



**Figure 4:** Medical Causes of Neonatal mortality

RDS - Respiratory Distress Syndrome, LBW - Low Birth Weight, IUGR- Intrauterine Growth Restriction, HIE- Hypoxic Ischaemic Encephalopathy

## DISCUSSION

Non-reduction in child mortality to two-thirds that has been specified in Millenium Development Goals (MDGs) between 1990 and 2015 was primarily attributed to escalated neonatal mortality in developing regions of the world [11]. However, decline in neonatal mortality across the globe has been recorded at the lower pace than that of under-5 mortality [12]. Targeted interventions should be done for minimizing neonatal mortality rate in terms of improved antenatal care, appropriate intrapartum measures and adequate post-delivery care of neonates. Most (35.6%) of neonatal deaths in current study were identified to be due to bacterial sepsis. This was followed by respiratory distress syndrome and intrauterine hypoxia among 22% and 19% of the dying neonates respectively. Significant chunk (14.4%) of the

neonates in present study succumbed to low birth weight or IUGR. On the other hand, maternal and child health surveillance carried out in China during 2014-2018 revealed preterm birth, prematurity and pneumonia as the predominant reasons for neonatal mortality [13]. Another study carried out among 12 dying neonates at a Children Hospital of Poland reflected congenital anomalies and chromosomal abnormalities as the prime contributors to mortality [14]. A prospective cohort study done in hospitals of Davangere, india and Pakistan during 2018-2020 illustrated that most (34%) of the deaths were attributed to intrauterine hypoxia while congenital malformations, infections and respiratory distress syndrome contributed almost equally (20%) to neonatal deaths [15]. In our study, two mothers had gestational diabetes while one had pregnancy induced hypertension. The study by Dhaded et al., highlighted maternal hypertension and preterm labour as the chief maternal causes for neonatal mortality [15]. Multiple factors associated with maternal health during pregnancy like social determinants, nutrition, various infections and inflammations are undoubtedly linked with grave fetal or neonatal health outcomes [16]. Of the diverse maternal factors, about 8-10% are constituted by preterm births that are mainly attributed to low socioeconomic status, smoking, stress and poor education [17]. Although a systematic analysis by Ohuma et al., concluded no significant difference in frequency of preterm birth worldwide over a decade; however, this inference was ascribed to poor data maintenance in South Asia and Sub-Saharan regions of Africa that are perceived to have maximum burden of preterm births [18]. Although in current research preterm birth has not been identified as maternal problem in affiliation with neonatal mortality; yet ensuring data transparency at all levels of healthcare facilities can help a great deal to measure the underlying disease burden in true spirit for taking appropriate strategic measures in return. Although booked and non-booked cases in present study are in equal proportion (Table 1); yet, majority (35%) of the booked cases were delivered at private hospitals while most (41.2%) of the non-booked cases underwent childbirth at homes. Only 5% babies were delivered at home by skilled birth attendants. A similar study carried out in rural population of Lahore during 2021 highlighted religious and cultural values among 62.9% of the mothers as predominant barrier to antenatal visits, although only 38.6% of them were satisfied with home delivery. Moreover, 70% and 51.4% had concerns of expenditures and transportation [19]. Although maternal mortality ratio of Pakistan has considerably declined from 230/100,000 live births (2010) to 154/100,000 live births (2020) [20]; yet 95% of the maternal deaths occur in under developed regions of the globe [21]. As maternal and

neonatal health are interlinked, one of the chief traits significantly impacting both entities is the place of delivery [22]. Another study done by Sadia et al., among rural inhabitants of Sindh illustrated that about one quarter of the pregnancies were subjected to home deliveries and 15.6% of them did not have any antenatal checkup. In addition, home delivery was found to be significantly associated with illiteracy [23]. Shifting the home-delivered baby to hospital for dealing with poor healthcare outcome cannot bring significant improvement. It becomes quite problematic later as the complications during pregnancy have not been monitored for ensuring safe delivery. Multiple contributing factors like education, parity, social class in present study have not been ruled out. There is possibility to encourage home delivery among Pakistani mothers by producing competent skilled birth attendants and dissemination of considerable information about maternal and childcare through endorsement of antenatal visits. Although home birth is determined quite advantageous to both mother and newborn, yet it needs ample coordination with hospital obstetricians and neonatologists as well in order to get rid of complications [24]. Providing free antenatal care and supplements to the deserving mothers at their doorstep is also likely to bring enormous transformation particularly in our rural communities. Most (36%) of the full-term babies were delivered in primary and secondary healthcare facilities while 45% of preterm births took place in private hospitals (Figure 3). Preterm births in our study might be accompanied with poor previous obstetric history due to which those birth took place in private hospitals. However, 8 preterm births took place at home that resulted in neonatal expiry secondary to bacterial sepsis and respiratory distress syndrome. Preterm neonates undeniably present with various anomalies in addition to low birth weight. The data pertaining to maternal, fetal and placental attributes among preterm babies should also be gathered for through studies [25]. About three quarter deaths among preterm babies are preventable by incurring adequate healthcare services particularly in maternity and neonatal units of hospitals in addition to capacity building of healthcare professionals [26]. Approximately 88.5% of deaths in current study were early neonatal which reflects the cruciality of first week of birth. Statistics illustrate about 75% of the deaths among early neonates which has been ascribed to pneumonia, malaria and diarrhea [3]. The frequency of neonatal mortality can significantly be mitigated by training of concerned healthcare workforce, implementation of SOPs regarding infection prevention and provision of adequate ventilatory services in hospitals.

## CONCLUSIONS

Majority of the neonatal deaths were during early neonatal

period. Most of them succumbed to bacterial sepsis and respiratory distress syndrome.

## Authors Contribution

Conceptualization: SZ

Methodology: SZ, FF

Formal analysis: FF, YH

Writing-review and editing: RS, SS, MA

All authors have read and agreed to the published version of the manuscript.

## Conflicts of Interest

The authors declare no conflict of interest.

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